

## SOLUBILITY

Solubility is the susceptibility of a rock to being dissolved. The solubility of any particular rock is dependent on the minerals that constitute the rock as well as the liquid that may dissolve these minerals. This activity demonstrates this important interdependence.

**Directions:** Review the activity, then answer the following questions before performing the experiments.

### Purpose:

What is the purpose of performing this experiment?

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### Hypothesis:

State your hypothesis regarding the outcome of this experiment.

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### Materials:

sodium chloride (NaCl — table salt)  
graduated cylinders (50 and 100mL)  
distilled water  
3 clear glass containers (vials, beakers, etc.)  
salts for making artificial sea water  
anhydrous isopropyl alcohol (>99% pure)  
laboratory stirring rods (or coffee stirrs)  
balance (capable of weighing as little as 0.1 gram)  
glassware for mixing sea water  
grease pen or pen and stick on labels

### Procedure:

1. Make artificial Great Salt Lake water by dissolving 20 grams (0.7 ounces) of NaCl in 100 milliliters (0.2 pints) of distilled water. (Stir until all the salt goes into solution.)
2. Weigh out 3 separate 5-gram (0.2 ounces) samples of NaCl.
3. Measure 14 mL (0.03 pints) **each** of distilled water, artificial Great Salt Lake water, and anhydrous isopropyl alcohol into the 3 clear glass containers. Be sure to label each container.

4. Add 1 of the 5-gram (0.2 ounces) samples of NaCl to each liquid and stir. (Use a separate stirring rod for each container.)
5. Note the amount of any solid remaining in the container.

**Observations:**

Describe your attempt to dissolve the 5 gram (0.2 ounces) NaCl sample in each of the following:

Distilled Water:

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Great Salt Lake Water:

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Anhydrous Isopropyl Alcohol:

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**Conclusion:**

1. Explain your results. Why do you think this happened?

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2. Why did the experiment call for distilled water instead of tap water?

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3. Anhydrous alcohol is alcohol that is essentially waterless. Why was it important to use “waterless” alcohol?

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4. How does this demonstration show that solubility depends on the properties of both the liquid and the solid?

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5. Why is the solubility of a rock important in siting a repository?

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6. Water, moving through a rock of uniform composition, will initially dissolve some minerals. As the water travels farther through the rock its ability to dissolve minerals decreases and eventually becomes zero. Why?

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